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progress and decline of typhoons and similar marked storms constitute a program of work that claims the careful attention of those who plan the expedition, and can not fail to command the interest and approval of men of science generally.

ON THE DISTRIBUTION OF PACIFIC INVERTEBRATES

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Read before the Academy, April 17, 1916. Received, May 24, 1916

The distribution of Marine invertebrates is important, as one of the keys to the former distribution of land masses, and to our very imperfect knowledge of their distribution in the Pacific. Certain species, usually those inhabiting the reefs and comparatively shallow water, are very widely distributed over the region usually referred to as Indo-Pacific; but when a careful collection of the species belonging to any isolated island or group is available it becomes evident that a large proportion of them are local and combine to form a local fauna. A knowledge of these faunas is necessary before any satisfactory discussion can be had of the presumably Tertiary fossiliferous deposits which are found fringing the more elevated Pacific islands. The landshells of the Hawaiian and Tahitian groups indicate a high antiquity for their isolation according to Pilsbry, the most eminent student of these animals. The facies of the Tertiary fossils obtained by Ochsner on the Galapagos Islands indicates a derivation from the American rather than the Indo-Pacific fauna, with which the recent invertebrates are commingled. These facts indicate the interest which attaches to a wider knowledge of the Pacific faunas.

THE MARINE ALGAE OF THE PACIFIC

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Read before the Academy, April 17, 1916. Received, May 24, 1916

In considering the desirability of an exploration of the Pacific Islands the following points relating to our knowledge of the marine algae of the Pacific may be mentioned. Our present knowledge is so fragmentary that it is not possible as yet to suggest any special problem of a general nature whose solution would be aided by a well arranged expedition. What the important general questions are we cannot tell until after a more thorough exploration has given us a more detailed knowledge of the species which inhabit the islands of different groups. It may be well therefore to give a general review of what we know from previous explorations of the different portions of the Pacific and at the same time to distinguish between those regions whose marine flora is now being studied successfully either by native algologists or by already organized bodies of collectors and explorers and those regions which are still in need of exploration by some specially organized expedition.

In this connection what is said must be understood to apply to the alga flora proper which is littoral and does not extend to any great depth and of which very few or no representatives are to be expected in deep soundings. In regard to the pelagic or plankton flora it may be assumed that no expedition would fail to make collections wherever and whenever possible.

Our knowledge of the algae of the Pacific has been obtained in part from the collections of the earlier national expeditions, few of which were accompanied by expert algologists, or from collections of a more recent date made by a very small number of residents of different islands who were interested in algae and by botanical travellers stopping for brief periods on their journeys across the Pacific. Islands lying on the trades routes have naturally been more frequently explored than others. In the earlier expeditions, even those whose object was ostensibly the exploration of the Pacific, we notice that the greater part of the time was spent in exploring the outlying islands as Hawaii, Japan, and New Zealand. In the Wilkes Expedition, which may be taken as a type of the old national expeditions, the algae collected were largely from Brazil, the West Coast of America, New South Wales and New Zealand, while hardly fifty species were obtained at Hawaii, the Fiji Islands and Tongatabu, with half a dozen, not including Diatoms, from the Philippines. In the majority of expeditions Hawaii, the Fiji Islands, and the Friendly Islands, were visited. Our knowledge of the Eastern Polynesian groups, as the Society Islands, the Marquesas Islands, and the Low Archipelago is derived largely from the early French expeditions, as that of the Bonite, that of D'Urville, Au Pol Sud, and that of Jardin to the Marquesas. Tahiti, however, was visited by numerous expeditions and it has been a favorite resort of botanical travellers in recent years. On the other hand, of such remote, small islands, as Pitcairn's and the Gambier Islands we have only the scantiest information. We are not to assume, however, that because very little has been found on the smaller islands that there is not much more which may be found.

The Hawaiian Islands have been visited by more expeditions than any other of the Pacific Islands, and their marine flora has lately been studied by competent algologists who have made large collections during a residence there; hence a new expedition will not spend more than a comparatively short time there. The case of the Philippines is peculiar. Although many expeditions have stopped there, the collections have been scanty and probably they do not fairly represent the marine flora of those large islands. Nevertheless it does not seem to be advisable to send a special expedition there for the study of algae because there is now in the Philippines a number of resident botanists who are able to collect year in and year out; and more is to be expected of them than from an expedition moving from one part of the Pacific to another. On the other hand the relation of the flora of the Philippines to that of the Caroline and Ladrone Islands ought to be closely studied. We have a limited knowledge of the species of those two groups obtained from various expeditions; and quite recently the Japanese algologist, Okamura, has published a paper on the Caroline algae. Other regions the relation of whose marine flora should be compared with that of the Pacific Islands are the Bismarck Archipelago and adjoining regions of which there are numerous, short scattered notices and the more eastern islands of the Dutch East Indies where collections have been recently made by the Siboga Expedition. It is hardly necessary to send a new expedition to those regions whose flora is being well studied by competent experts.

After this statement of the regions to which it is inadvisable to send an expedition for the reasons given above, we may turn to a more exact consideration of the regions more in need of exploration. As has been said, the islands lying in or near the trade routes from Australia and New Zealand to North America have not infrequently been visited by botanists. These islands are the Fiji, the Samoa and the Friendly Islands groups. One of the more important papers on these groups is that of Grunow on the algae collected by Von Graeffe, including about 120 species. The distinguished algologist, W. H. Harvey, also issued a set of Friendly Island algae. From these and other papers we know the main features of these islands, but there must be much more to be learned about them. We would advise a new exploring expedition to make either Fiji or Samoa a base of operations. Starting thence as a centre, a year could be well spent in a careful study of the whole group of Polynesian Islands, the Friendly Islands to the Marquesas on the northeast and Pitcairn's Island on the southeast. Another year, or better more, should be spent in traversing the Solomon Islands to the Caroline and Ladrone groups returning by the Gilbert and Marshall Islands to Samoa and thence to Hawaii on the return voyage.

As will be seen, I have assumed that the exploration should last several years. A hurried trip with short stops at a few remote points is not enough at the present day. What we wish is a more detailed knowledge so that the fragmentary facts which we now possess may be fused into a more complete picture of the Pacific Marine Flora. Then and not until then shall we be able to discuss intelligently the question of the distribution and general character of the insular floras and their relation to those of the nearest continents.

The exploration of the marine flora is of course only one of the numerous objects of an expedition to the Pacific, but it is an important object when one considers the great extent of the coast to be studied. The work in this important field should be intrusted to an expert well trained in the study of algae and not left to the chance work of a general collector who, although he might bring back valuable material, could not be expected to recognize the smaller species which are quite as interesting, often more interesting than the larger species.

THE PACIFIC AS A FIELD FOR ETHNOLOGICAL AND ARCHAEOLOGICAL INVESTIGATION

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Read before the Academy, April 17, 1916 Received, May 24, 1916

In the following suggestions regarding the Pacific as a field for anthropological investigation the valuable work already accomplished in this branch of study has not been overlooked. The contributions which, from time to time, have been published by local students have been most important, and the admirable reports of expeditions sent out by the different governments of Europe and by local museums, have revealed a wealth of material on the aboriginal inhabitants of the Pacific.

But the field for anthropological investigation in the Pacific is so vast that many additional laborers are needed to gather the plenteous harvest it offers. There is an urgent call for coöperation of many more specialists so that this work may be carried on as part of a coördinated plan, systematically followed. This necessitates more observations on the migrations of the Polynesians, Melanesians, and dark races of the Pacific, to determine their center of origin and diffusion from island to island, a study directly connected with geographical phenomena. Investigations of the colonization of the Pacific islands, of the migration of man from island to island, and of the effect of insular environment on human culture, are very attractive fields of research. Much remains